
Selaginella longistrobilina (Selaginellaceae), a New Species from Guizhou, China, and *Selaginella prostrata*, a New Combination and Its Lectotypification

Li-Bing Zhang*

Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166-0299, U.S.A.,
and Chengdu Institute of Biology, Chinese Academy of Sciences, P.O. Box 416,
Chengdu, Sichuan 610041, People's Republic of China

Pei-Shan Wang and Xiao-Ying Wang

Guizhou Academy of Sciences, Guiyang, Guizhou 550001, China

*Author for correspondence: libing.zhang@mobot.org

ABSTRACT. A new lycophyte species, *Selaginella longistrobilina* P. S. Wang, X. Y. Wang & Li Bing Zhang (Selaginellaceae), is described and illustrated from limestone hills in central Guizhou, China. *Selaginella longistrobilina* is most similar to *S. prostrata* H. S. Kung in the shape of the microphylls and in the arrangement, shape, and size of the sporophylls. However, the new species has longer strobili to 2.5 cm, and the sporophylls are often navicular adaxially, while *S. prostrata* has strobili only 3–4 mm, and the sporophylls are flattened adaxially. *Selaginella longistrobilina* is only known from central Guizhou, while *S. prostrata* is more widely distributed from Hunan, Sichuan to Yunnan in China. A new combination, *S. prostrata* (H. S. Kung) Li Bing Zhang, based on *Lycopodioides prostrata* H. S. Kung, is made and lectotypified herein.

Key words: China, Guizhou, IUCN Red List, *Selaginella*, Selaginellaceae.

When Professor Chu of Yunnan University prepared his treatment of Selaginellaceae for the *Flora Yunnanica*, he examined the material of *Selaginella prostrata* H. S. Kung from Guizhou, Sichuan, and Yunnan cited by Kung (1981). Chu (2006) noticed that specimens from northeastern Yunnan were similar to those from Sichuan, but that Guizhou collections represented an undescribed species distinguishable from *S. prostrata* in the morphology of the strobili, sporophylls, and microspores. Our investigation confirms Chu's (2006) observations, and the new species is described herein.

Selaginella longistrobilina P. S. Wang, X. Y. Wang & Li Bing Zhang, sp. nov. TYPE. China. Guizhou: Anshun City, on rocks and crevices on hill, 1500 m, 29 Oct. 1978, P.-S. Wang

75606 (holotype, PYU; isotypes, CDBI, MO).
Figure 1.

Diagnosis. *Selaginella longistrobilina* P. S. Wang, X. Y. Wang & Li Bing Zhang is most similar to *S. prostrata* (H. S. Kung) Li Bing Zhang, but the former has longer strobili to 2.5 cm and the sporophylls are often navicular adaxially, while the latter has strobili only 3–4 mm long and the sporophylls are flattened adaxially.

Plants to 15 cm; stems prostrate, 2.5–4 mm wide including microphylls, 1 to 4 times dichotomously branched; main stems branched throughout, stramineous, ca. 0.2 mm diam. in mid-portion, terete, slightly sulcate; lateral branches 6 to 10, simple or to 3 times dichotomously branched, branchlets 1–3 cm apart from each other; ultimate branches 2–3 mm wide including microphylls; rhizophores borne throughout. Microphylls dimorphous: lateral microphylls patent, ovate, 1.5–1.8 × 1–1.5 mm, base slightly cordate, apex mucronate or cuspidate, margins white, ciliate; median microphylls ovate, 0.8–1.3 × 0.4–0.7 mm, base rounded, apex shortly aristate, margins white, ciliate; axillary microphylls ovate to lanceolate, 0.7–1.5 × 0.3–0.5 mm, base rounded, apex acuminate, often disappearing with development of rhizophores at approximate positions. Strobili compact, dorsiventrally complanate, solitary or paired (forked), on terminal to lateral stems, 3–25 mm. Sporophylls located from below branching positions of ultimate branchlets upward, strongly dimorphic, non-resupinate, their arrangement, shape, and size same as or similar to those of trophophylls; ventral sporophylls sunken adaxially, broadly lanceolate, adaxially navicular, ca. 0.5 × 1.8 mm, base rounded, apex acuminate, margins ciliate; dorsal sporophylls broadly lanceolate to narrowly ovate, adaxially flattened, ca. 0.6 × 1.6 mm, base rounded,

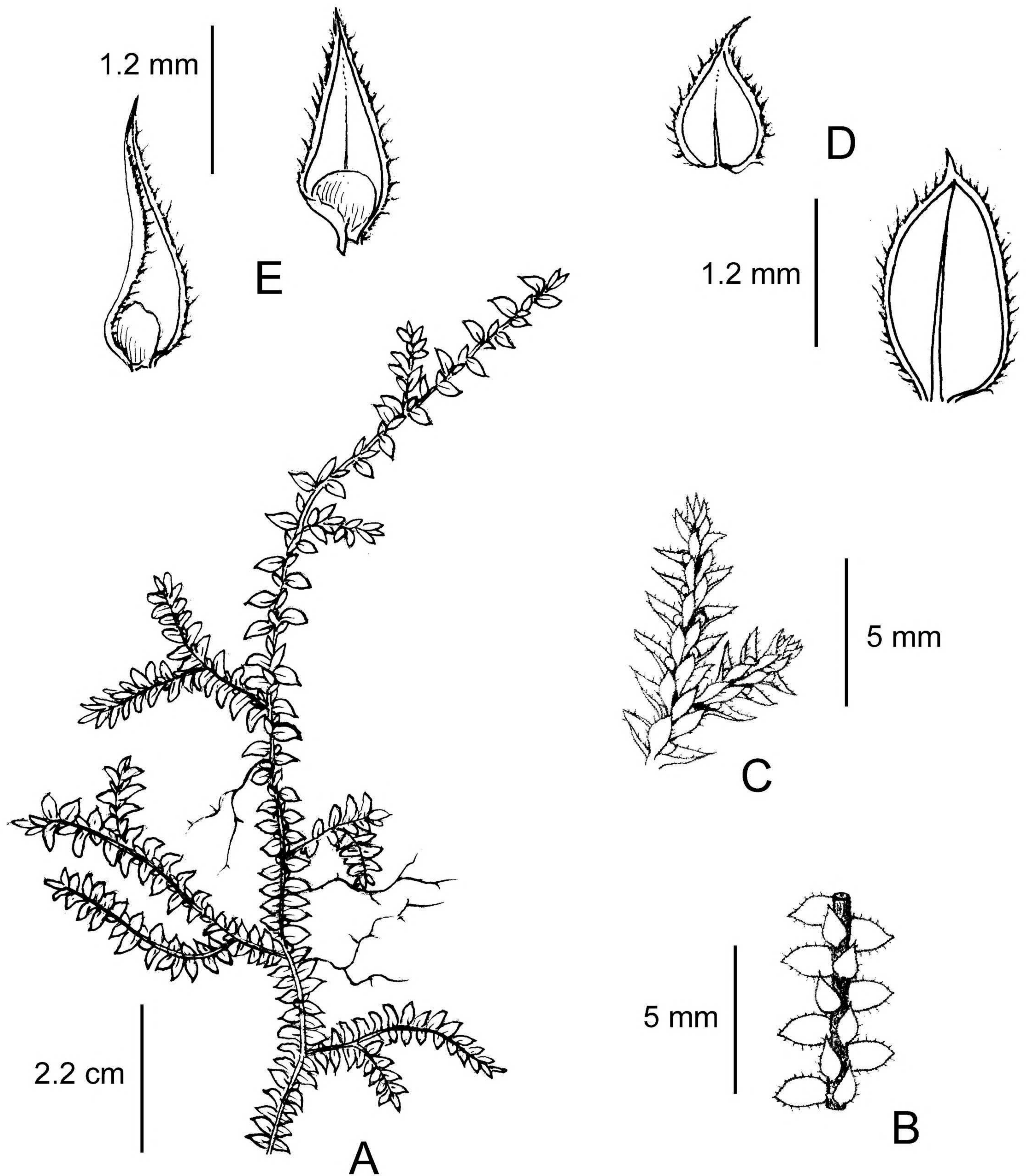


Figure 1. *Selaginella longistrobilina* P. S. Wang, X. Y. Wang & Li Bing Zhang. —A. Plant habit. —B. Portion of main stem showing lateral microphylls and median microphylls. —C. Strobili. Note that sporophylls start from below the branching positions of ultimate branchlets upward. —D. Microphylls, lateral microphyll at right, median at left. —E. Sporophylls, ventral, navicular sporophyll at left, with dorsal, flattened one at right. Based on the isotype, P.-S. Wang 75606 (CDBI).

apex acuminate, margins ciliate. Macrosporangia 1 to 5, at basal portion of strobili, elsewhere with more than 15 microsporangia; microspores ocherous, the sculpturing verrucate with irregularly sized verrucae, the colpi twisted, usually not forked at ends, and reaching the equatorial plane of the spore; macrospores 4 in each macrosporangium, light orange.

Distribution and habitat. *Selaginella longistrobilina* is currently known only from Anshun City in central Guizhou, China. It is possible that this species also occurs in adjacent similar areas in central Guizhou. *Selaginella longistrobilina* was collected from the weathered crust of limestone rocks and among crevices under secondary mixed forests on

a hill at an elevation of 1500 m. The soil at the type location was of a basic pH.

IUCN Red List category. Only two populations of *Selaginella longistrobilina* were observed at the type locality, with fewer than 20 individuals in total found. The new species might occur elsewhere in a nearby similar habitat. Based on the best evidence available, this taxon can be classified as Critically Endangered (CR) according to IUCN Red List criteria (IUCN, 2008).

Etymology. The epithet of the new species is taken from the Latin prefix, “longi-,” meaning “long,” and the Latin “strobilina,” meaning “of the strobilus,” which refers to the long strobili.

Discussion. *Selaginella longistrobilina* has been confused with *S. prostrata* (H. S. Kung) Li Bing Zhang (comb. nov.; see below) since the publication of the basionym of the latter, *Lycopodioides prostrata* H. S. Kung (Kung, 1988; Wang & Wang, 2001). When describing a taxon identified as “prostrata” (Kung, 1981; the name not validly published; see later discussion), Kung (1981) cited three gatherings from Guizhou, Sichuan, and Yunnan, which included both taxa. Specimens from Sichuan and Yunnan do correspond with Kung’s “prostrata” (Chu, 2006), while the collection from Guizhou is selected herein as the type of the newly described *S. longistrobilina*.

Both taxa are indeed similar to each other in the shape of the microphylls and also share other similarities in the arrangement, shape, and size of the sporophylls. However, the two taxa do differ in the morphology of their strobili, sporophylls, sculpturing of spores, and colpi of microspores as noted by Chu (2006). *Selaginella longistrobilina* often has strobili to 2.5 cm and its sporophylls are located from below branching positions of ultimate branchlets upward. The larger sporophylls are adaxial and clearly navicular. Microspores have verrucate sculpturing with irregularly sized verrucae; the colpi of microspores are twisted, usually not forked at the ends, and they reach the equatorial plane of the spore. Irregularly verrucate sculpturing of the microspores is common among species of *Selaginella* P. Beauv. In contrast, *S. prostrata* has shorter strobili, to only 3–4 mm, and the sporophylls are located only at the termini of ultimate branchlets. Its sporophylls are flattened adaxially, with only a few of the upper, adaxial sporophylls slightly navicular. The microspores are tuberculate with regularly sized tubercles; the microspore colpi are straight, forked at the ends, and do not extend to the equatorial plane.

Paratype. CHINA. **Guizhou:** Anshun City, on rocks & crevices on hill, 1500 m, 24 June 1978, P.-S. Wang 75550 (PYU, Herbarium Pei-Shan Wang [Guizhou Institute of Biology]).

Selaginella prostrata (H. S. Kung) Li Bing Zhang, comb. nov. Basionym: *Lycopodioides prostrata* H. S. Kung, Fl. Sichuan. 6: 76, pl. 20, parts: 7–11. 1988. [Latin diagnosis & description in Kung, Acta Bot. Yunnan. 3: 254. 1981.] TYPE. China. Sichuan: Emei Shan, Jiushijiudaoguai, Shouxingqiao, 4 July 1955, X.-J. Zheng 30071 (lectotype, designated here, PE; isolectotype, SZ not seen).

Discussion. When Kung (1981: 254) described his *Selaginella prostrata*, he cited three gatherings: X.-J. Zheng 30071 from Sichuan, NE Yunnan Exp. 808 (KUN not seen, PE, PYU not seen) from Yunnan, and P.-S. Wang 75606 (CDBI, MO, PYU, Herbarium Pei-Shan Wang [Guizhou Institute of Biology]) from Guizhou, but he failed to designate one collection as type, as noted by Chu (2006). Therefore, this name was not validly published by Kung in 1981, following the *International Code of Botanical Nomenclature* (McNeill et al., 2006, Art. 37.1).

Later, Kung (1988: 76) made a new combination, “*Lycopodioides prostrata* (H. S. Kung) H. S. Kung,” based on his 1981 invalid name in *Selaginella*. Kung (1988: 76) implicated one of the three gatherings cited in Kung (1981) as the type, X.-J. Zheng 30071 from Emei Shan in Sichuan, by stating that “the type was collected from Emei Shan” in Chinese. This type designation, together with Kung’s (1988: 76) reference to the previously and effectively published Latin description and diagnosis by him (Kung, 1981: 254), validated the publication of *L. prostrata* H. S. Kung (1988) as a new species (McNeill et al., 2006: Art. 36.1) instead of a new combination or the name *S. prostrata* H. S. Kung, which Kung (1988) did not intend to publish. Article 37.7 does not apply, since the specific deposit of the type was not required by the *Code* until 1990. The herbarium of deposit for the type of *L. prostrata* was not indicated by Kung (1988). There are two specimens known to us for X.-J. Zheng 30071, which are deposited at PE and SZ, and herein we designate the specimen at PE as lectotype. We were able to confirm the taxonomic identity of the PE sheet, but did not see the SZ specimen, and thus the better known PE specimen is chosen.

Acknowledgments. We thank Wei-Ming Chu of Yunnan University for initially noticing and summarizing the differences between *Selaginella longistrobilina* and *S. prostrata*. We thank Faqiang Lü

for the line drawing, and two anonymous reviewers, Victoria Hollowell, Roy Gereau, and Nick Turland for helpful comments. We thank the curators of the herbaria CDBI, MO, PE, and PYU for providing access to the material in their care.

Literature Cited

- Chu, W. M. 2006. Selaginellaceae. Pp. 35–93 in C. Y. Wu (editor), *Flora Yunnanica*, Vol. 20. Science Press, Beijing.
- IUCN. 2008. IUCN Red List Categories and Criteria, Version 7. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland, and Cambridge, United Kingdom.
- Kung, H. S. 1981. Contributions to the genus *Selaginella* Beauv. from Sichuan. *Acta Bot. Yunnan.* 3: 251–256.
- Kung, H. S. 1988. *Selaginella* P. Beauv. Pp. 56–80 in *Flora Sichuanica*, Vol. 6. Sichuan Science & Technology Press, Chengdu.
- McNeill, J., F. R. Barrie, H. M. Burdet, V. Demoulin, D. L. Hawksworth, K. Marhold, D. H. Nicolson, J. Prado, P. C. Silva, J. E. Skog, J. H. Wiersema & N. J. Turland (editors). 2006. International Code of Botanical Nomenclature (Vienna Code). *Regnum Veg.* 146.
- Wang, P.-S. & X.-Y. Wang. 2001. *Pteridophyte Flora of Guizhou*. Guizhou Science & Technology Press, Guiyang.